Chapter 3

Recommended Preliminary Screening Criteria for TDM Measures

It is impossible to recommend a combination of TDM measures, which will be effective for any given project, without knowing a substantial amount about the environment of that project. The following chapter presents a series of steps to assess that environment, and identify the primary types of TDM measures which may work best. It is important to remember that any given project may exhibit a number of the characteristics described below, and that the way these characteristics interact will vary with each situation. Therefore, the measures for such a complex project may well be different than a simple summation of the measures suggested here.

Demand management is anchored in the travel market. This chapter uses four screening categories, and seventeen criteria in all, to review and assess that travel market in order to determine which TDM strategies will be most effective. This should not be viewed as a prescription to be followed, but rather as a set of guidelines and perspectives for considering primary TDM strategies that may apply. The following pages discuss the criteria listed below in more detail. For an example of how this screening criteria can be applied, refer to Appendix 2.

Alternative Mode Services

1. Availability of Alternative Modes that are competitive to SOVs
2. Alternative Mode Potential
3. Availability of Mode Support Strategies
4. Availability of Mode Support Facilities

Roadway Characteristics

5. Level of Congestion
6. Availability of Alternative Routes
7. Identification of Significant Trip Generators
8. Available Capacity Outside of Peak

Operating Environment

9. Policy Environment
10. Technological Environment
11. Public/Private Cooperation
12. Public Attitudes

Land Use

13. Housing Density
14. Employment Density
15. Mixture of Uses
16. Urban Environment and Design
17. Future Development

Alternative Mode Services

This category examines the types and levels of existing HOV/transit support services and facilities.

Criteria #1: Current Availability of Alternative Modes

What kind of HOV/transit service currently exists? Is it competitive with SOV travel? Are there transit routes serving the area? Are there vanpools that operate, either employer based or area wide? Are shuttle services available that serve a nearby transit or activity center?

Available HOV/Transit Services:

- Increase promotion of existing services
- Develop HOV/transit incentives
- Develop SOV disincentives

Inadequate HOV/Transit Services:

- Develop/improve HOV/transit services for study area
- Consider implementation of custom transit services, carsharing or vanpool programs
- Review pricing policies, adjust if necessary
- Encourage spreading of peak travel hours

Criteria #2: Future Alternative Mode Potential

When alternative modes are present, what is the level of utilization? Do services operate at or near capacity, or are they underutilized? Is there latent demand for HOV/transit alternatives?

Transit/HOV Modes Operate at Capacity

- Expand capacity

Transit/HOV Modes Operate Below Capacity

- Increase promotional efforts
- Adjust service if necessary to better meet community needs
- Increase support activities and programs (both public and private)
- Construct TDM support facilities if necessary (i.e., Park & Ride lots)
- Implement/strengthen SOV disincentives

Criteria #3: Availability of Alternative Mode Support Strategies

Besides actual alternative modes, what facilitating and support strategies are available? Is there a regional ridematch system? Do any trip reduction ordinances require employers to undertake certain HOV supportive activities? Are Transportation Management Associations present in the region that can provide support? What kind of promotional activities have taken place?

Available Support Strategies

- Increase promotion
- Insure that services meet community needs.
- Implement SOV disincentives

Moderate or Few Support Strategies

- Strengthen existing services or initiate new services

Criteria #4: Availability of Alternative Mode Support Facilities

Do facilities such as HOV lanes, access and signal priority, Park & Ride lots, and bicycle facilities exist? Is it feasible to add to the existing infrastructure?

Available Support Facilities

- Increase promotion of existing services/facilities
- Improve or enhance transit/ HOVservices to facilitate greater use of facilities
- Initiate local feeder bus service, or other custom transit strategies, to accommodate local portion of trip
- Strengthen SOV disincentives
- Encourage supportive land uses

Inadequate Support Facilities

- Add to or improve support facilities network
- Encourage alternative work schedules to spread out peak use hours
- Encourage supportive land uses

Route and Trip Characteristics

This category examines the factors which affect travel along and within the impacted corridor.

Criteria #5: Level of Congestion

Using measures such as level of service (LOS), vehicle miles traveled (VMT), average vehicle occupancy (AVO), mode choice percentages, and hours of delay, how congested is the impacted corridor? How is it expected to change in the future?

Current Congestion

- Consider short-term strategies
- Improve transit service
- Improve other support services
- Strengthen/implement SOV disincentives
- Encourage alternative work schedules

Future Congestion

- Consider land use strategies
- Develop/improve mode support facilities

Criteria #6: Availability of Alternative Routes

If a facility is highly congested, are there alternate routes which could serve some trips?

Available Alternative Routes

- Encourage use of alternate routes
- Develop Advanced Traveler Information Systems (ATIS)

Inadequate Alternative Routes

- Increase promotion of transit/HOV alternatives
- Establish or increase transit/HOV incentives
- Improve transit service
- Establish or increase SOV disincentives
- Encourage use of alternative work schedules to spread peak
- Work with affected jurisdictions to increase regional/local connectivity

Criteria #7: Identification of Significant Trip Generators

To what extent is the traffic within the study area caused by trip generators inside the area? Are there major employment sites, residential sites, or special attractors within the corridor, or is traffic "passing through" to sites outside the study area?

Major Internal Employment Sites

- Consider worksite-based TDM strategies
- Increase support activities/ facilities
- Consider trip reduction ordinances
- Consider custom transit services
- Encourage employers to allow alternative work hours and telecommuting
- Encourage development of on-site amenities or mixed use development
- Encourage the balance of jobs and housing (increase housing within study area)

External Trip Generators

- Apply actions to source of trip generation
- Construct transit/HOV support facilities
- Look at regional solutions

Major Internal Special Attractors

- Investigate custom transit strategies
- Include traffic mitigation measures in the development process
- Consider trip reduction ordinances

Major Internal Residential Sites

- Investigate improving transit/ HOV services
- Consider construction of HOV facilities
- Encourage infill and compact development
- Encourage transit and pedestrian friendly design

Criteria #8: Available Capacity Outside Peak

How long is the peak period, and is there room outside of the peak to spread use?

Available Off-peak Capacity

- Encourage telecommuting and alternative work schedules
- Consider congestion pricing schemes
- Consider peak period commercial traffic restrictions

Inadequate Off-peak Capacity

- Construct transit/HOV facilities
- Improve transit service
- Encourage telecommuting

Operating Environment

This category examines the institutional, technological and political framework within an area that may enable (or preclude) certain types of actions.

Criteria #9: Policy Environment

What ordinances, policies, plans, etc., exist that may provide support for alternative mode usage? Are they being adhered to? These may exist as policies or regulations on planning, land use, growth management, or environmental protection, as well as transportation.

Supportive Policy Environment

- Insure that programs/development occur as planned
- Tighten loopholes in policies to ensure implementation reflects original intent

Inadequate Policy Support

- Work with policymakers to develop supportive policies

Criteria #10: Technological Environment

What is the state of the technology in the area? What electronic infrastructure exists to support data collection or distribution? Is the area covered by a "Traffic Management Center"? Are telephone, cable, or computer network technologies available and readily accessible?

Advanced Technological Environment

- Develop and utilize traveler information systems
- Develop systems to facilitate toll collection, if applicable
- Encourage/facilitate development of internet-based trip reduction strategies

Inadequate Technological Environment

- Begin to develop the technological infrastructure where feasible
- Develop plans for long term technological goals

Criteria #11: Public/Private Cooperation

What type of trust and cooperation exists between private employers and developers and government agencies and transit providers? Is there a common recognition of the problems and their solutions or is the relationship more confrontational? Do any Transportation Management Associations exist?

Cooperative Spirit

- Work together on more innovative solutions

Confrontational Spirit

- Provide services and assistance when possible
  Collaborate to solve problems together; build trust

Criteria #12: Public Attitudes

How do the public and elected leaders feel about the situation? Have there been recent public votes on tax levies or bond issues to support transportation projects? How have they fared? How are existing TDM projects being received? Is new tax policy political suicide, or are people ready to "try anything"? Have any recent attitudinal surveys been done?

TDM-Supportive Public

- Maintain support through out-reach
- Identify ways to improve transit service
- Develop HOV facilities
- Consider SOV disincentives and other more aggressive TDM measures

Unsupportive or Unaware Public

- Undertake research to determine what the issues are
- Conduct a public education cam-paign
- Work to create understanding and consensus

Land Use

This category examines the current and future land use environment in the area under study.

Criteria #13: Housing Density

What is the current and planned housing density within the study area?

Low Housing Density

- Work to increase housing density and mix of uses around areas already served by transit
- Consider innovative or custom transit strategies
- Consider carsharing
- Consider HOV support facilities
- Consider Park & Ride lots
- Encourage telecommuting and alternative work schedules

High Housing Density

- Improve or expand existing transit service
- Increase promotion
- Consider carsharing and location-efficient mortgages (LEMs)

Criteria #14: Employment Density

What is the current and planned employment density within the study area?

Low Employment Density

- Encourage TMA formation to help provide worksite-based services
- Consider vanpools, carpools, and other custom transit strategies
- Encourage development of on-site amenities or mixed-use development
- Work to improve jobs/housing balance within the study area

High Employment Density

- Insure that transit service meets the needs of users
- Improve transit/HOV services
- Increase facilities
- Implement parking management programs

Criteria #15: Mixture of Uses

To what extent are types of land uses segregated or integrated in the target area?

Highly Segregated Land Uses

- Rezoning to allow mixed uses
- Implement local shuttle service
- Develop other custom/innovative transit services
- Work with employers to provide on-site services at worksites

Well Balanced Land Uses

- Develop incentive programs to encourage use of "locally" provided services
- Seek to make the walking/ bicycling environment more friendly

Criteria #16: Urban Environment and Design

Is the study area, or any activity center within the study area, pedestrian or transit oriented? Are walkways safe and inviting, are transit shelters provided?

Pedestrian/Transit Oriented Environment

- Improve transit service
- Improve bike and pedestrian support facilities
- Develop financial incentives
- Implement SOV disincentives
- Consider carsharing

Auto Oriented Environment

- Retrofit the built environment with transit and pedestrian amenities where possible
- Accompany retrofits with service improvements

Criteria #17: Future Development

What are the plans for this area? Is it a designated "urban center," "activity center," or "corridor"? Is it slated to remain essentially as it is, or is it to develop as a future employment, residential or activity center?

Major Changes in the Future

- Insure that future developments provide for transit usage
- Insure that future developments are pedestrian and bicycle friendly

Few Foreseeable Changes in the Future

- Implement relevant TDM measures to reduce future congestion (which will increase regardless!)

Chapter Four

Complementary TDM Strategies

Determining an appropriate package of TDM strategies can be a daunting task to the uninitiated. Although there is some awareness of what TDM is, often planners and engineers are unfamiliar with the full range of available TDM options, and will encounter some difficulties when developing a package of integrated TDM strategies. The matrix (Table 4.1) presented in this chapter can be useful in developing an awareness of the interrelationships between and among various TDM strategies and using this knowledge to form an effective alternative or program.

Reading the Companion Strategies Matrix

While the matrix may appear complex, its reading is quite straightforward. Reading down the columns are listings of *TDM Measures*, *Highly Complementary Strategies* and *Corridor Applicability*. Reading across the rows, each measure has an identification code (e.g., W1 for *Monetary Incentives*), followed by the strategy's name/description, a list of highly complementary TDM measures and a rating of the measures' applicability on a corridor basis.

Selecting Primary and Complementary Strategies

To use the Companion Strategies Matrix effectively, first select one or more TDM strategies that are appropriate to the particular situation being examined. Using the screening criteria described earlier should provide several primary strategies suitable to the project under consideration. These primary strategies should yield some HOV percentage increase or SOV percentage decrease, thereby providing at least a partial alternative to build options. The purpose of the Companion Strategies Matrix is to provide additional tools to augment the effectiveness of the strategies provided by the screening process.

With a few exceptions, TDM strategies are universally complementary. However, some are more complementary than others. For example, *Transit* or *Vanpool Services* are good TDM techniques in their own right, but the effects of either increase synergistically when combined with *Guaranteed Ride Home* and *Promotion*.

As companion strategies, *Transit Services* and *Vanpool Services* provide one of those rare examples of techniques which may be somewhat counterproductive when tied together in some markets. For instances, offering extensive vanpool service in a CBD may duplicate existing transit routes, and ridership for both services may suffer. Vanpools are better in areas that are not well-served by transit, for suburb-to-suburb commutes, or very long distance commutes. Planners should be aware of the potential for negative impacts, and may want to consider alternative strategies which are positive or neutral in their effects on existing or proposed companion TDM measures.

Synergies and Multiplier Effects

As noted earlier, TDM measures can have a synergistic effect on each other. For example, Frank and Pivo noted several examples of synergistic relationships in *Relationships Between Land Use and Travel Behavior in the Puget Sound Region* (1994). While housing and employment density each affect mode choice, in combination their individual effect can be greatly enhanced. For example, increasing population density at the origin and destination of modeled shopping trips to 40 people per acre increased transit use from 1.74% to 7%. Incorporating an employment density of 100 employees per acre in addition to the population density of 40 per acre yielded another 4% transit utilization, for an 11% total share.

A 1994 Cambridge Systematics, Inc. study for the Federal Highway Administration suggests other synergies. In particular, the Cambridge study notes the effectiveness of combining land use and urban design characteristics with financial inducements to alter commute trip behavior. The study also finds that employer-provided transportation assistance programs, while insignificant alone, achieved meaningful changes in drive-alone modal share and average vehicle occupancy rates when incorporated at sites which had a variety of nearby convenience-oriented services (dry cleaners, post offices).

In creating a package of TDM measures it is essential to develop a mix of approaches. Although more research needs to be done, it appears that incorporating a variety of strategies from all six TDM category types may increase the effectiveness and political viability of the TDM option. For example, an effective corridor-based TDM program might include:

- area-wide ridematching services, transit and vanpool service increases with corresponding fare subsidies from **Public Mode Support Measures**;
- mixed land use and jobs/housing balance, urban design (pedestrian and transit oriented), and residential and employment density increases from **Land Use Strategies**;
- congestion pricing from **Pricing Strategies**;
- guaranteed ride home, parking management, commute support programs and alternative work programs from **Worksite-Based TDM Measures**;
- telecommuting from **Telecommunications Strategies**; and
- restrict access to facilities and activities centers, trip reduction ordinances, and parking restrictions from **Policy and Regulatory Strategies**.

Incorporating strategies from a broad array of sources is useful in two ways: First, it increases the potential effectiveness of the TDM alternative. This is accomplished both through providing more measures which are likely to reduce vehicle miles traveled on their own

merit, and through the greater opportunities for synergistic effects which accompany a broader utilization of TDM measures. In the example above, synergies are likely to be generated between any action in one category and most actions from other categories. For example, *increase in transit services* is likely to benefit synergistically from all the **Land Use, Pricing** and **Policy and Regulatory Strategies** cited, as well as from *guaranteed ride home*, *parking management*, *commute support programs* from **Worksite-Based TDM Measures**. Examination of other TDM strategies suggests similarly broad synergies.

Second, by incorporating a broadly based variety of strategies, the political burden of enacting potentially unpopular measures is shared. Elected officials may feel less heat if a mix of strategies, some of which are reliant on the private sector, are utilized, rather than developing a predominant reliance upon **Policy and Regulatory** and **Pricing Strategies**. Furthermore, incorporating measures whose costs are borne by those incurring the (future) demands on the system, such as most **Land Use Strategies**, may establish a sense of fairness in the process, creating greater acceptance of the other strategies which assess costs to present travelers who have rarely been charged the full cost of their travel to date.

Table 4.1
Complementary Strategies Matrix

Alternative Mode Support Strategies		Highly Complementary Strategies	Corridor Applicability
A1	Public Education and Promotion	all other TDM strategies	High
A2	Ridematching Services	W1-W5 especially complementary, also A4, A7, R2, L3, P1, P3	High
A3	Transit Services	all except A2, A4, E2, T1 and T2	High
A4	Vanpool Services	W3, W4, A2 highly complementary, also A7, A1, P5	High
A5	Custom Transit Service	A1, A3, A6, A7, W3-W5 and all Pricing strategies	Medium
A6	Non-Motorized Mode Support	A1, A3, W5, L1-L5	High
A7	HOV Facilities	A2, A3, A5, A8, P3, R2	High
A8	Park & Ride Lots	A2, A2, A5, A7, W5, L3	High
A9	Carsharing	A3 is essential, A1, P1, P5, L1, L6 and L8 also complementary	Medium
Worksite-Based Strategies		**Highly Complementary Strategies**	**Corridor Applicability**
W1	Monetary Incentives	Complements all Worksite-Based Strategies; A2, A3, A4	Medium
W2	Alternative Work Schedules	T1, P1, P3, R1	High
W3	Guaranteed Ride Home	A1, A2, A3, A4, A6	High
W4	Parking Management	P1 especially complementary, also A2-A5	High
W5	Facility Amenities	A2-A6	Medium
W5	Transportation Management Associations	All other Worksite-Based Strategies; R1	High
Land Use Strategies		**Highly Complementary Strategies**	**Corridor Applicability**
L1	Compact Residential Development	All other Land Use Strategies, A3, A5, A6, A9	High
L2	Compact Employment and Activity Centers	All other Worksite-Based & Alternative Mode Support Strategies; L3 and L5-L8	High
L3	Mixed Land Uses	All Other Land Use Strategies; A3, A6	High

Table 4.1
Complementary Strategies Matrix

Land Use Strategies		Highly Complementary Strategies	Corridor Applicability
L5	Transit/Pedestrian Friendly Urban Design	All other Land Use Strategies; A3, A6	High
L6	Parking Management	Alternative Mode Support Measures; W5, P1, P3	High
L7	Jobs/Housing Balance	L3, L8, R3	Medium
L8	Affordable Housing	All other Land Use and Pricing Strategies, A3, A6, R3	High
L9	Development Impact Mitigation	All Land Use Strategies; A3, A6	High
Programmatic and Policy Support		**Highly Complementary Strategies**	**Corridor Applicability**
R1	Trip Reduction Ordinances and Programs	Aids all TDM efforts; particularly Worksite-Based Alternative Mode Support Strategies	High
R2	Access Priority/Restriction	Aids all TDM efforts; especially helpful to Alternative Mode Support Strategies	High
R3	Support of New Institutional Relationships	L8 and all other Land Use Strategies, R1, T1, T2, W2, W6	High
Telecommunications Strategies		**Highly Complementary Strategies**	**Corridor Applicability**
T2	Information Services	all Alternative Mode Support Strategies, R2	High
T3	Other Internet-Based Strategies (teleshopping)	W5, W2, R2, L3 and all Pricing Strategies	Medium
T1	Telecommuting	W2, R1, R2 and all Pricing Strategies	Medium
Pricing Strategies		**Highly Complementary Strategies**	**Corridor Applicability**
P1	Parking Pricing	A3, A5, A7, A8, W4, L6, R1 and R3	Medium
P2	Gasoline Tax Increase	All Alternative Mode Support Strategies, R3	Low
P3	Road/Congestion Pricing	A1, A2, A3, A5, A7, S8, W2, T2, R2 and all Land Use Strategies	High
P4	VMT Tax	A3, A5, A7	Low
P5	Transit and Vanpool Fare Subsidies	A1, A3, A4, A5, W1	High